

Low-mass dileptons from pion-rho scattering in hot matter*

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We consider the contribution of pion-rho scattering to the dilepton production in relativistic heavy ion collisions. The importance of this contribution especially in the region of invariant masses around 500 MeV has been debated intensively [1-3]. We have based our calculation on a chiral invariant effective Lagrangian, where the vector mesons are incorporated as massive Yang Mills fields.

The resulting dilepton rate based on all tree level diagrams and their interferences is about a factor of 2 larger than the rate obtained from only the s-channel a_1 -diagram, which has been used in most calculations so far.

To the same level of approximation, the elastic pion-rho scattering leads to a broadening of the width of the rho meson of about 100 MeV at temperatures $T=150$. Thus a consistent calculation of the dilepton yield including the $\pi + \rho$ channel should also include the effect of the collisional broadening of the rho meson.

Including these additional processes into our transport model [4] we, however, obtain only a small increase of the total dilepton yield. Consequently the calculated dilepton invariant mass spectrum, while consistent within the sum of statistical and systematic errors, is still substantially lower than the central data points of the CERES measurement for central S+Au heavy ion collisions [5] in the mass region around 500 MeV. In case of Au+Pb collisions, our results are in satisfactory agreement with the CERES measurement [6] (see figure).

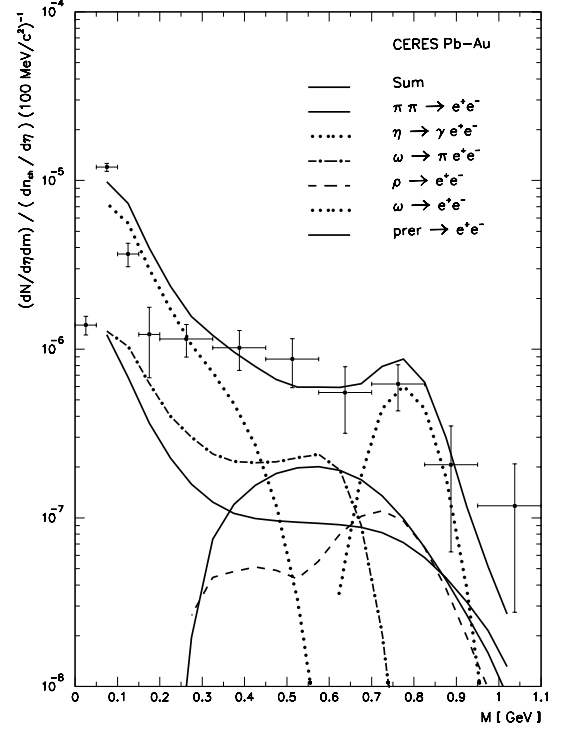


Figure 1: Dilepton invariant mass spectrum for Au+Pb collisions at 156 A GeV. The data are from [6]. Only statistical errors are shown.

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